

The City of Brockton, MA

Request for Proposals for

Streetlight and Outdoor School LED Retrofit Lighting

RFP #DPW-17LED

Issued: (Mon.) October 24, 2016

Legal Notice of Request for Proposals

**CITY OF BROCKTON
DEPARTMENT OF PUBLIC WORKS
FY '17 REQUEST FOR PROPOSALS
Project #DPW-17LED**

Proposal documents may be picked up on/after **(Mon) Oct. 24, 2016** in the Department of Procurement, Basement Level, Rm. B9, City Hall, 45 School Street, Brockton, MA 02301 for the following DPW activity:

**PURCHASE OF: STREETLIGHT AND OUTDOOR SCHOOL LED RETROFIT LIGHTING
CNT#DPW-17LED**

Four (4) sets (one **original** and **three** copies) must be submitted in two separately sealed envelopes. The proposals are due on/before **(Wed.) Nov. 30, 2016 @ 4:30 p.m.** ESDT at the Department of Procurement, City Hall, 45 School Street, Basement Level, Rm. B9, Brockton MA, 02301. All proposals submitted after this time shall not be accepted.

Proposals for Part I and Part II must be submitted separately in sealed envelopes marked as follows:

***Part I –City of Brockton: Streetlight and Outdoor School LED Retrofit Lighting:
Non Price Proposal***

***Part II –City of Brockton: Streetlight and Outdoor School LED Retrofit Lighting:
Price Proposal***

The City reserves the right to accept and/or reject and/or to waive any informality on any/all proposals.

The City of Brockton is an Affirmative Action/Equal Opportunity/Title IX Employer.

Proposal packages are also available in electronic format for download at:
www.brockton.ma.us. Go to the Information Tab, then to Procurement Postings.

Any/all questions regarding this proposal may be addressed by calling the Chief Procurement Officer at (508) 580-7191.

Table of Contents

Legal Notice of Request for Proposals	2
Table of Contents	3
1. Introduction	5
1.1 Instructions to Responders	5
1.1.1 Pricing	5
1.1.2 Requirement for Electronic Data Files	5
1.1.3 Estimated Quantities.....	5
2. General Information and Proposal Submission Requirements	7
3. RFP Response Format and Contents	8
3.1 LETTER OF TRANSMITTAL.....	8
4. Terms and Conditions.....	9
5. RFP Process Timeline.....	10
5.1 Contact Information.....	10
6. Required Signature Forms.....	11
6.1 Proposal Signature Page.....	12
6.2 Certifications Page.....	13
6.3 Additional Certifications Page	14
7. Evaluation of Proposals.....	15
7.1 Mandatory Submission Requirements.....	15
7.2 Comparative Evaluation Criteria	16
7.2.1 Experience	16
7.2.2 Qualifications and References.....	16
7.2.3 Quality Control.....	17
7.2.4 Product Origin.....	17
7.2.5 Luminaire Performance and Requirements	17
7.2.6 Energy Savings	17
7.2.7 Product Specifications	18
7.2.8 Ability to Deliver Light Fixtures.....	18
8. Required Submittals.....	19
9. Exhibit "A" – Product Specifications	22
9.1 Criteria for Products.....	22
9.2 Product Requirements.....	23
9.2.1 Brockton Owned Roadway Luminaires	24
9.2.2 Brockton Schools Outdoor Lighting	43
9.3 Luminaire General requirements.....	54
9.4 Painted or finished luminaire surfaces exposed to the environment	54
9.5 Thermal management.....	54
9.6 LED Driver, Photo-control Receptacle, and Control Interface.....	55
9.7 Electrical safety testing	55
9.8 Electrical immunity	55
9.9 Interference and power quality.....	55

9.10	Color attributes	55
9.11	Identification	56
9.12	Quality Assurance.....	56
9.13	Warranty.....	56
9.14	Manufacturer Services.....	56
9.15	Eligible Manufacturers	57
9.16	Long Life Photo Controls Requirements.....	57
10.	Exhibit “B” – Product Submittal Form.....	58
11.	Appendices A to G.....	59
12.	Appendix H – National Grid - Customer Owned Streetlight Equip Standards	60

1. Introduction

The City of Brockton (the "City") is requesting proposals for **STREETLIGHT AND OUTDOOR SCHOOL LED RETROFIT LIGHTING** in accordance with this Request for Proposals (RFP). The selected Supplier shall provide the City with LED lights for the replacement of City-owned streetlights and Brockton School Lighting as described in Exhibit A – Product Specifications.

This RFP contains the information and documents necessary to prepare and submit a response. Proposers are responsible for complying with all requirements identified herein. By submitting a finished proposal package, the Proposer represents that it has thoroughly examined and become familiar with the work required within this proposal and it is capable of performing quality work to achieve the City's objectives. Requests for modifications to the submitted proposal packet on the grounds that the Proposer was not fully informed as to any fact or condition will not be allowed. The City reserves the right to accept or reject any Proposal, or portions thereof, or to waive any informalities or irregularities within the proposals.

1.1 Instructions to Responders

1.1.1 Pricing

Price of all the LED lights proposed. Costs shall be firm for the term of the agreement except where there is a reduction in cost. Any reduction in cost for the LEDs shall be passed on to the City. Include pricing, using the form in Exhibit B "Product Submittal Form", for all of the LED light types proposed, and include the Total "Not to Exceed". Exhibit B "Product Submittal Form" must be submitted (in electronic version on a CD, DVD or USB Flash drive, with a signed paper copy of the summary tab) in a separately sealed envelope marked: Part II – Streetlight and Outdoor School LED Retrofit Lighting (Price Proposal).

All product unit prices (i.e. luminaires, brackets, photocell, etc.) submitted on Exhibit B "Product Submittal Form" must include all shipping and handling costs of indicated products to the address of the selected Installer's.

The Installer will be selected by the City of Brockton under a separate bid. Once this bid is awarded, the City of Brockton will provide the "Ship to" address to the winner of this Request of Proposal. The City of Brockton expects this shipping address to be located in proximity to the City of Brockton.

The City of Brockton plans to place an order to the successful respondent for all products after the awarding of this Request of Proposal. The City plans to complete the LED conversion project in 2017. All prices submitted in Exhibit B "Product Submittal Form" must be valid throughout 2017.

1.1.2 Requirement for Electronic Data Files

Proposals must include the IES files corresponding to each lighting product proposed; record this on a CD, DVD or USB Flash drive and include this with your proposal.

1.1.3 Estimated Quantities

Exhibit B – Product Submittal form includes Luminaire types and Estimated Quantities. These reflects the estimates of the luminaires to be purchased by the City during the LED conversion project. Estimated quantities will be used for comparison of responses. The quantities, as estimated, may or may not be purchased during the conversion project. The City reserves the right to exceed or not meet the estimated quantities as its needs dictate. Once the respondent

and LED fixture manufacturer(s) have been selected, the Lighting Designer contracted by the City of Brockton will conduct a final audit verification and/or photometric designs. This process will be completed in order to ensure quality and accuracy for all the products being ordered. In the event that, as a result of the final audit/photometric review, new LED products (s) need to be included in the replacement inventory, this will be handled as a change order.

Any mounting devices or hardware (i.e. adaptors, brackets, etc.) required to mount the LED fixtures to the existing facilities is the responsibility of the Supplier. Respondents must include the Adaptor/Bracket model number in Exhibit B – Product Submittal form and indicate the price.

2. General Information and Proposal Submission Requirements

This Request for Proposals (RFP)

Proposal Due Date:	(Wed.) November 30, 2016 on/before 4:30 p.m.
Proposal Subject:	Streetlight and Outdoor School LED Retrofit Lighting
RFP Number:	#DPW-17LED
RFP Availability:	The RFP will be available starting on (Mon.) October 24, 2016 by contacting Mr. Michael Morris/Chief Procurement Officer at (508) 580-7191, or via email: mmorris@cobma.us
Return RFPs to:	Brockton City Hall, Procurement Department, Basement Level - Room B9 45 School Street, Brockton, MA 02301

Please read this entire document before responding or submitting questions.

3. RFP Response Format and Contents

Four (4) sets (*One (1) original and three (3) copies*) of the proposal shall be delivered no later than **4:30 P.M. on (Wed.) November 30, 2016.**

As required by G.L., c.30B, s.6(b)(3), the RFP Response shall be provided in two (2) separately bound parts as described in the following sections. The two (2) parts shall be marked:

***Part I –Streetlight and Outdoor School Lights LED Retrofit Lighting:
Non Price Proposal***

***Part II – Streetlight and Outdoor School LED Retrofit Lighting
Price Proposal.***

The two parts must be submitted in separate sealed envelopes. Upon receipt of the RFP responses, a review committee shall be set up to evaluate Part I of all respondents. For the prospective consultant deemed to be best qualified under Part I, the City will open Part II.

Proposals should be prepared simply, providing a straightforward description of the prospective consultant's ability to satisfy the requirement of the RFP. Emphasis should be on completeness and clarity of contents.

The City of Brockton assumes no responsibility and no liability for costs incurred relevant to the preparation and submission of the RFP by prospective consultants, or any other costs prior to issuance of a contract.

The City may reject any RFP Response that does not meet these requirements.

3.1 LETTER OF TRANSMITTAL

The prospective consultant's Response shall include a letter of transmittal not to exceed one (1) page, signed by an individual(s) authorized to bind the prospective Consultant contractually. This letter must state that the RFP will remain valid from the date of submission through **4:30 P.M. on Wednesday, November 30, 2016** the deadline for submission of the RFP response, a contract is executed; or the procurement is terminated by the City, whichever occurs first.

The transmittal letter shall include the name, title, address, and telephone number of one or more individuals who can respond to requests for additional information and also, of one or more individuals who are authorized to negotiate and execute a contract on the prospective consultant's behalf, if applicable.

4. Terms and Conditions

- 1) The City will not be responsible for the premature opening of any proposal not properly identified. The City shall award any contract within 30 days from the proposal due date.
- 2) The City reserves the exclusive right to reject any or all proposals.
- 3) Proposals which are incomplete, not properly endorsed, or signed, or which are otherwise contrary to these instructions may be rejected.
- 4) Pursuant to G.L., c.30B, the City may waive "minor informalities" or allow the vendor to correct them. Other minor errors will be clarified in the spirit and letter of c.30B. Conditional proposals will not be considered as responsive pursuant to c.30B.
- 5) Purchases of goods and services by the City are exempt from the payment of Federal excise taxes and Massachusetts' sales tax, and any such taxes must not be included in the price computations.
- 6) The successful contractor will not be permitted to assign or underlet the contract, nor assign either legally or equitably, any moneys hereunder, or its claim thereto, without the previous written consent of the City.
- 7) The proposal for work detailed in the purchase description must cover all contingencies, including labor, materials, transportation, and all others, necessary for delivery of the project required by the City.
- 8) Inquiries concerning any part of this proposal shall be made in writing at least five (8) business days prior to the date the proposals are due. All questions will be answered in writing. If the City issues any addenda to this proposal, each vendor shall acknowledge on both proposal forms the receipt of each addendum by writing the addendum number and date.

5. RFP Process Timeline

Legal notices posted, RFP released	(Mon.) October 24, 2016
Last date for Questions and Requests for Clarification Due, in writing via email, to Michael Morris/CPO email: mmorris@cobma.us	(Thur.) November 17, 2016
Addendum issued	(Mon.) November 21, 2016
Proposals due 4:30 pm	(Wed.) November 30, 2016
Reserved for potential interviews	TBD
Expected date of final selection; City notifies selected vendor of award	TBD

5.1 Contact Information

All questions and other communications related to this RFP should be directed to:
Michael Morris – Chief Procurement Officer. Email: mmorris@cobma.us

6. Required Signature Forms

The following forms must be signed and included with your submission, Part I.

- 1) Letter of Transmittal
- 2) Proposal Signature Page (Section 6.1)
- 3) Certifications Page (Section 6.2)
- 4) Additional Certifications Page (Section 6.3)
- 5) Non-Price Proposal Response (Part 1)
- 6) City Appendices (A-G)
- 7) In a separate envelope: Price Proposal Page (Part 2) Exhibit B--Product Submittal form.**
Please include an electronic copy of this Excel document, **and a signed paper copy of the summary tab.**

6.1 Proposal Signature Page

Complete this page and return as a cover sheet for the completed technical proposal.

2016-To Be Determined

Company Name Contact Person

Street Phone

City, State, Zip Fax

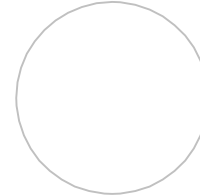
Email

Submits the attached proposal for this Request for Proposals (RFP) to the City of Brockton, on the authority of the undersigned and as dated below. I confirm and pledge to abide by and be held to the requirements of this RFP and its resulting contract, to perform any tasks and deliver any documents required, and to execute a Contract with the City of Brockton.

Authorized Agent of the Contractor:

Signature (blue ink please)

Printed Name



(If a corporation, attach
certificate of vote or
apply corporate seal here)

Title

Date

Proposal must be signed by a duly authorized officer(s) eligible to sign contract documents for the firm. Consortiums, joint ventures, or teams submitting proposals will not be considered responsive unless it is established that all contractual responsibility rests solely with one contractor or one legal entity. The Proposal must indicate the responsible entity.

Contractor should be aware that joint responsibility and liability will attach to any resulting contract and failure of one party in a joint venture to perform will not relieve the other party or parties of total responsibility for performance.

6.2 Certifications Page

Complete this page and return with completed technical proposal.

2016-To Be Determined

As required under Chapter 233 and 701 of the Massachusetts Acts and Resolves of 1983 and Chapter 30B of the Massachusetts General Laws certification must be made to the following by signing in the space indicated below. Failure to offer such signature will result in rejection of the proposal.

- A. The undersigned certifies under penalties of perjury that this proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word person shall mean any natural person, business, partnership, corporation, union, committee, club or other organization, entity, or group or individuals and also;
- B. Pursuant to M.G.L. c.62C, §49A, I certify under the penalties of perjury that to my best knowledge and belief the undersigned has complied with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

Authorized Agent of the Contractor:

Signature (blue ink please) Name (as used for tax filing)

Printed Name SS# or Federal ID#

Title Date

Proposal must be signed by a duly authorized officer(s) eligible to sign contract documents for the firm. Consortiums, joint ventures, or teams submitting proposals will not be considered responsive unless it is established that all contractual responsibility rests solely with one contractor or one legal entity. The Proposal must indicate the responsible entity.

Contractors should be aware that joint responsibility and liability will attach to any resulting contract and failure of one party in a joint venture to perform will not relieve the other party or parties of total responsibility for performance.

6.3 Additional Certifications Page

Complete this page and return with completed technical proposal.

2016-To Be Determined

Pursuant to 28 CFR Part 42.204 (d), I certify that my employment practices comply with Equal Opportunity Requirements and complies with 28 CFR Part 42.202; that my organization complies with the Americans with Disabilities Act; that I have received the following Addenda:

Addenda Numbers:

Authorized Agent of the Contractor:

Signature (blue ink please)

Printed Name

Title

Date

Proposal must be signed by a duly authorized officer(s) eligible to sign contract documents for the firm. Consortiums, joint ventures, or teams submitting proposals will not be considered responsive unless it is established that all contractual responsibility rests solely with one contractor or one legal entity. The Proposal must indicate the responsible entity.

Contractors should be aware that joint responsibility and liability will attach to any resulting contract and failure of one party in a joint venture to perform will not relieve the other party or parties of total responsibility for performance.

7. Evaluation of Proposals

All proposals will be reviewed by an Evaluation Committee in accordance with M.G.L. c. 30B (Chapter 30B). Final selection will be based upon an evaluation and analysis of the information and materials required under the RFP.

Proposals that meet the Quality Requirements will be reviewed in accordance with the comparative evaluation criteria below. Each member of the Evaluation Committee will assign a rating of Highly Advantageous, Advantageous, Not Advantageous or Unacceptable, to each comparative evaluation criterion.

Based on these evaluation criteria ratings, a composite rating by each evaluator will be determined for each proposal. After the evaluations are complete, the price proposals will be evaluated and ranked based on total price.

The contract will not necessarily be awarded to the proposal that receives the highest ranking with respect to the price proposal. The City will award the contract to only one responsive and responsible vendor submitting the most advantageous proposal taking into consideration the proposals' quality requirements, evaluation criteria, composite ratings and price.

Before awarding the contract, the City may request additional information from the vendor. The City reserves the right to reject any and all proposals if it determines that the criteria established herein have not been met.

7.1 Mandatory Submission Requirements

Mandatory Requirements are evaluated on a pass or fail basis. Failure to adhere to the following mandatory requirements shall result in a Proposal being declared a Non-Compliant Proposal and will be given no further consideration. The City of Brockton may decide to terminate the evaluation upon the first finding of non-compliance with a mandatory requirement.

- Proposal, required signature forms and digital files must be received at the closing location prior to closing date and time.
- Proposal must be in English.
- Any changes on the original proposal should be made in ink and initialed by the person signing the proposal. Please use Appendix form "F" Deviation Sheet to list any changes to the proposal and/or specs.
- One (1) computer printed original and one (1) copy of Part I of the proposal and one (1) electronic copy (on DVD or USB storage device) must be submitted. One electronic copy of Part II must be submitted in a separate sealed envelope, along with a signed paper copy of the summary tab.
- All Addenda must be acknowledged using the Additional Certifications Form.
- Inclusion of all point rated requirements as outlined below.

7.2 Comparative Evaluation Criteria

The proposals will be evaluated based on the criteria listed below, and scored as follows: Highly Advantageous, Advantageous, Not Advantageous and Unacceptable.

7.2.1 Experience

Highly Advantageous:

Manufacturer has Five (5) or more years of experience in manufacturing LED streetlight fixtures

Advantageous:

Manufacturer has more than three (3) but less than five (5) years of experience in manufacturing LED streetlight fixtures

Not Advantageous:

Manufacturer has less than three (3) years of experience in manufacturing LED streetlight fixtures

Unacceptable:

Manufacturer has less than one (1) year of experience in manufacturing LED streetlight fixtures

7.2.2 Qualifications and References

Highly Advantageous:

For each family of cobra head luminaires being proposed, Manufacturer has five (5) or more completed projects with luminaires the same or similar as those proposed herein, in the United States or a jurisdiction with a similar climate (projects must include at least 5,000 fixtures)

Advantageous:

For each family of cobra head luminaires being proposed, Manufacturer has three (3) or four (4) completed projects with luminaires the same or similar as those proposed herein, in the United States or a jurisdiction with a similar climate (projects must include at least 5,000 fixtures)

Not Advantageous:

For each family of cobra head luminaires being proposed, Manufacturer has less than three (3) completed projects with luminaires the same or similar as those proposed herein, in the United States or a jurisdiction with a similar climate (projects must include at least 5,000 fixtures)

Unacceptable:

For each family of cobra head luminaires being proposed, Manufacturer completed no projects with luminaires the same or similar as those proposed herein, in the United States or a jurisdiction with a similar climate (projects must include at least 5,000 fixtures)

For each project include the following information:

- Installation end date, total number of luminaires supplied, installed, and operating
- List and contact information of customer

Number of project and references provided shall not exceed seven (7).

7.2.3 Quality Control

Highly Advantageous:

The facility/facilities that manufacture(s) the LED luminaires and associated components are ISO9001 certified or equivalent, indicating quality management systems.

Not Advantageous:

The facility/facilities that manufacture(s) the LED luminaires and associated components are not ISO9001 certified or equivalent.

7.2.4 Product Origin

Highly Advantageous:

LED Products are manufactured in North America.

Unacceptable:

LED Products are not manufactured in North America.

7.2.5 Luminaire Performance and Requirements

Highly Advantageous:

100% of the proposed luminaires meet or exceed the lighting performance criteria described in Section 8 – Item 8 “Computer-generated point-by-point photometric analysis of maintained light levels.” This includes all criteria a) Average luminance at pavement, b) Avg:min uniformity ratio, c) Max:min uniformity ratio, and d) Max. veiling luminance ratio.

Advantageous:

100% of the proposed luminaires meet or exceed the lighting performance criteria described in Section 8 – Item 8 “Computer-generated point-by-point photometric analysis of maintained light levels.” This includes only criteria a) Average luminance at pavement while keeping an acceptable uniformity on the surface.

Not Advantageous:

Between 95% and 99% of the total Proposed luminaires meet or exceed the lighting performance criteria described in Section 8 – Item 8 “Computer-generated point-by-point photometric analysis of maintained light levels.” This includes only criteria a) Average luminance at pavement while keeping an acceptable uniformity on the surface.

Unacceptable:

Less than 75% of the total Proposed luminaires meet or exceed the lighting performance criteria described in Section 8 – Item 8 “Computer-generated point-by-point photometric analysis of maintained light levels.” This includes only criteria a) Average luminance at pavement while keeping an acceptable uniformity on the surface.

7.2.6 Energy Savings

Highly Advantageous:

Luminaires recommended provide energy savings in Demand (kW) of more than 60% (in comparison to the existing baseline).

Advantageous:

Luminaires recommended provide energy savings in Demand (kW) of more than 50% but less than 60% (in comparison to the existing baseline).

Not Advantageous:

Luminaires recommended provide energy savings in Demand (kW) of less than 50% (in comparison to the existing baseline).

7.2.7 Product Specifications

Highly Advantageous:

More than 95% of the Proposed Luminaires meet or exceed all technical specification requirements listed in Exhibit A – Products Specifications.

Advantageous:

Between 90% and 94% of the Proposed Luminaires meet or exceeds all technical specification requirements listed in Exhibit A – Products Specifications.

Not Advantageous:

Between 75% and 89% and of the Proposed Luminaires meet or exceeds all technical specification requirements listed in Exhibit A – Products Specifications.

Unacceptable:

Less than 75% of the Proposed Luminaires meet or exceeds all technical specification requirements listed in Exhibit A – Products Specifications.

7.2.8 Ability to Deliver Light Fixtures

Highly Advantageous:

Supplier can deliver Cobrahead fixtures between 4-6 weeks after of signing contract.

Advantageous:

Supplier can deliver Cobrahead fixtures between 7-9 weeks after of signing contract.

Not Advantageous:

Supplier can deliver Cobrahead fixtures after 10 or more weeks of signing contract.

8. Required Submittals

1. Exhibit B - Product Submittal Form, filled in, with a printed and signed copy of the Summary Page. Include the complete spreadsheet digital file and submit electronically as explained in the Introduction.
 - 1.1. Family grouping in accordance with LED Lighting Facts is permitted, provided this is clearly indicated on the submittal form provided in Exhibit B, and clearly communicated in the proposal that includes detailed calculations relating the tested product(s) to the submitted product.
2. All other signature pages, as specified in the Required Signature Forms section.
3. Product cut sheets
 - 3.1. Both Luminaire and Long Life Photocell cut sheets.
4. Instructions for installation and maintenance
5. Summary of luminaire recycled content and recyclability
 - 5.1. Shall be in accordance with the FTC Green Guides, expressed as a percentage of luminaire weight.
6. IES LM-79 luminaire photometric report(s)
 - 6.1. Provide the IES files for each type of light as described in the Introduction.
 - 6.2. Shall be produced by the test laboratory
 - 6.2.1. The test laboratory shall satisfy LED Lighting Facts accreditation requirements.
 - 6.3. Shall include the following information
 - 6.3.1. Name of test laboratory
 - 6.3.2. Report number
 - 6.3.3. Date
 - 6.3.4. Complete luminaire catalog number
 - 6.3.5. Description of luminaire, LED light source(s), and LED driver(s)
 - 6.3.6. Goniophotometry
 - 6.3.6.1. IES TM-15 Backlight-Uplight-Glare (BUG) ratings shall be for initial (worst-case) values, i.e., Light Loss Factor (LLF) = 1.0.
 - 6.3.6.2. If luminaires are tilted upward for calculations in item 7.1.2 below, BUG ratings shall correspond to the same angle(s) of tilt

7. Lumen maintenance calculations and supporting test data

7.1. Shall be in accordance with LED Lighting Facts guidance.

7.1.1. Exception: calculations shall be based on the cumulative hours of operation specified in item 9.2 "Product Requirements" below.

7.1.2. Submit completed ENERGY STAR TM-21 Calculator as an electronic Excel file.

8. Computer-generated point-by-point photometric analysis of maintained light levels.

This section Only required for the following Luminaire Designations.

- "Layout 01 - Local Low"
- "Layout 02 - Collector Low"
- "Layout 03 - Collector Medium"
- "Layout 04 - Major Medium"
- "Layout 05 - Major Medium"
- "Layout 06 - Major Medium"
- "Layout 07 - Major High"
- "Decorative Type B"
- "Decorative Type C"
- "Decorative Type G"
- "Decorative Type H"

8.1. Calculation/measurement points shall be per IES RP-8-14. Separated vehicular lanes, and walkways shall be evaluated separately.

8.2. Calculations shall be for maintained values, i.e. Light Loss Factor (LLF) < 1.0, where $LLF = LLD \times LDD \times LATF$, and

8.2.1. Lamp Lumen Depreciation (LLD) shall be determined by the manufacturer and be based on the percentage of initial output at 88,000 operating hours calculated in accordance with IESNA LM-80 and TM-21. The TM-21 extrapolation can however be up to 14 times.

8.2.2. Luminaire Dirt Depreciation (LDD) = 0.90

8.2.3. Luminaire Ambient Temperature Factor (LATF) = 1

8.3. Mesopic multipliers (i.e., effective luminance factors) shall not be used. All values shall assume photopic visual adaptation.

8.4. Submit IES LM-63 format electronic file containing luminous intensity data associated with submitted LM-79 report(s) and used for point-by-point calculations.

9. Summary of Joint Electron Devices Engineering Council (JEDEC) or Japan Electronics and Information Technology Industries (JEITA) reliability testing performed for LED packages

10. Summary of reliability testing performed for LED driver(s)

11. Written product warranty as per item 9.13 in section below.

12. Safety certification and file number indicating compliance with UL 1598

12.1. Applicable testing bodies are determined by the US Occupational Safety Health Administration (OSHA) as Nationally Recognized Testing Laboratories (NRTL) and include: CSA (Canadian Standards Association), ETL (Edison Testing Laboratory), and UL (Underwriters Laboratory).

13. Documentation supporting any U.S. origin claims for the product, in accordance with FTC guidance.

14. ISO9001 - Provide certificate(s) for manufacturing/assembly facility(s).

15. Statement defining product delivery lead times. If lead times differ from each fixture type, please detail each fixture type with respective lead time.

Note: All of the information requested in this section must be sent electronically (as PDFs or IES files), except the Required Signature Forms and the Summary Page of Exhibit B, which are required to be submitted as both a hard copy (computer printed) and electronically as previously instructed.

9. Exhibit “A” – Product Specifications

9.1 Criteria for Products

The following specifications cover the requirements for LED/Solid State Luminaires for Street Lighting and Outdoor School Lighting. City Owned Roadway Luminaires shall be configured as traditional cobra head style or alternative approved style(s) used in street lighting applications. Non-Cobra head style luminaires including Decorative, Floodlight, Area, Wall Pack, etc. shall be similar to the City’s current standard. Only new LED fixtures will be considered. Retrofit kits will not be considered.

Luminaire types in Brockton Schools - Outdoor Lights: A1, B1, F1, G1, J1, K1, L1, N1, Q1, R1, U1, V1, X1, Y1, Z1 must comply with the following specifications only:

- Luminaries must be Design Light Consortium listed (Standard or Premium) and must appear in the DLC qualified product list at the time of submission.
- LED bulbs must be Energy Star approved (only applicable for re-lamping cases).
- 5-year Warranty.
- When applicable, must include integrated Photo Control Devices (i.e. button type photocell).
- Brockton Schools Outdoor LED products must meet or exceed the minimum initial lumens listed in the Table 9.2.2.1 - Minimum Initial Lumens.
- Available in the following CCT: 4000K.
- Dimmable Drivers, 0-10V (for the LED fixtures)

The requirements listed in items 9.2 to 9.15 below apply to the following products/luminaire types:

City Owned Roadway Luminaires

- Cobra head style luminaires (*) (approximately 7,045 luminaires).
 - Layout 01 - Local Low
 - Layout 02 - Collector Low
 - Layout 03 - Collector Medium
 - Layout 04 - Major Medium
 - Layout 05 - Major Medium
 - Layout 06 - Major Medium
 - Layout 07 - Major High
- Decorative and Flood Light/Area Light luminaires (approximately 235).

All types: A, B, C, D, E, F, G, H, I, J, K, L

(*) For Cobrahead fixtures only: All respondents should use luminaires of 4000K when preparing Computer-generated point-by-point photometric analysis of maintained light levels. However, all model of LED Cobrahead fixtures proposed must be available in 3000K at the same price of the 4000K. The City reserves the right to order fixtures in 4000K for Major, Intersections, and Collector Roads and 3000K for local roads and residential areas, independent from the pedestrian activity.

School - Outdoor Light Luminaires

- Cobra head style luminaires
- Decorative luminaires and Flood Light/Area Light luminaires

Only the following types: C1, D1, E1, H1, I1, M1, O1, P1, S1, T1, W1.

If luminaires do not require photometric designs, LED products must meet or exceed the minimum initial lumens indicated for each fixture type as specified in the tables in section 9.2.1 Brockton Owned Roadway Luminaires.

9.2 Product Requirements

Tables summarizing the key parameters and product criteria follow. The tables show the current HPS and the replacement LED. They are separated into Brockton roadway lighting and School outdoor lighting.

9.2.1 Brockton Owned Roadway Luminaires

9.2.1.1 Luminaire Designation: "70W HPS Cobrahead - Layout 01 - Local Low"

SITE PARAMETERS			
ROADWAY DATA	Median width (including curbs, gutters, and shoulders)		0 ft
	Number of vehicular lanes (total on both sides of median)		2
	Width of one vehicular lane		13 ft
	IES pavement class. <input type="checkbox"/> R1 <input type="checkbox"/> R2 <input checked="" type="checkbox"/> R3 <input type="checkbox"/> R4		
SIDEWALK DATA	Berm width (from curb to sidewalk)		2 ft
	Sidewalk width		5 ft
	Sidewalk on <input type="checkbox"/> Both sides of street <input checked="" type="checkbox"/> Pole side <input type="checkbox"/> Other side		
LIGHT POLE DATA	Luminaire mounting height		26 ft
	Arm length (horizontal)		6 ft
	Luminaires per pole		1
	Pole set-back from curb		2 ft
	Pole spacing (one pole cycle, parallel to path of travel)		150 ft
	Pole layout <input checked="" type="checkbox"/> One side <input type="checkbox"/> Opposite <input type="checkbox"/> Staggered <input type="checkbox"/> Median		
PERFORMANCE CRITERIA			
MAINTAINED ROADWAY ILLUMINATION			
LUMINANCE	Average luminance at pavement		0.3 cd/m ²
	Avg:min uniformity ratio		6.0
	Max:min uniformity ratio		10.0
DISABILITY GLARE	Max. veiling luminance ratio		0.4
MAINTAINED SIDEWALK ILLUMINATION			
PHOTOPIC ILLUMINANCE	Average horizontal at pavement		4.0 lux (0.4 fc)
	Avg:min uniformity ratio (horizontal)		4.0
	Min. vertical illum. at 4.9 ft, in directions of travel		1.0 lux (0.1 fc)
LED LUMINAIRE			
INPUT POWER	Max. nominal luminaire input power		NA
VOLTAGE	Nominal luminaire input voltage (or range as applicable)		120-277
LUMEN MAINT.	Min. % of initial output at 36,000 hours operation		90%
WARRANTY	Min. luminaire warranty		10 years
NOMINAL CCT	Rated correlated color temperature		3000&4000 ± 200K
BUG RATINGS	Max. nominal backlight-uplight-glare ratings		B1-U0-G1
FINISH	Luminaire housing finish color		Gray
MOUNTING	Method <input type="checkbox"/> Post-top <input checked="" type="checkbox"/> Side-arm <input type="checkbox"/> Trun./yoke <input type="checkbox"/> Swivel-tenon		
	Tenon nominal pipe size (NPS)		2"-3/8 - 3"
VIBRATION	ANSI C136.31 <input type="checkbox"/> Level 1 (normal) <input checked="" type="checkbox"/> Level 2 (bridge/overpass)		
THERMAL ENVIRONMENT	Typical min. ambient temperature during operation		-40 °C (-40°F)
	Typical max. ambient temperature during operation		40 °C (104°F)
ELECTRICAL IMMUNITY	ANSI C136.2 Comb. Wave Test Level	<input type="checkbox"/> Basic (6kV / 3kA) <input checked="" type="checkbox"/> Enhanced (10kV / 5kA) <input type="checkbox"/> Elevated (20kV / 10kA)	
CONTROL INTERFACE	<input type="checkbox"/> None <input type="checkbox"/> ANSI C136.10 (3-pin) <input type="checkbox"/> ANSI C136.41, 5-pin <input checked="" type="checkbox"/> ANSI C136.41, 7-pin		
LED DRIVER	<input type="checkbox"/> Not dimmable <input checked="" type="checkbox"/> Dimmable, 0-10V (IEC 60929) <input type="checkbox"/> Dimmable, DALI (IEC 62386)		

9.2.1.2 Luminaire Designation: "100W HPS Cobrahead - Layout 02 - Collector Low"

SITE PARAMETERS			
ROADWAY DATA	Median width (including curbs, gutters, and shoulders)		0 ft
	Number of vehicular lanes (total on both sides of median)		2
	Width of one vehicular lane		16 ft
	IES pavement class. <input type="checkbox"/> R1 <input type="checkbox"/> R2 <input checked="" type="checkbox"/> R3 <input type="checkbox"/> R4		
SIDEWALK DATA	Berm width (from curb to sidewalk)		2 ft
	Sidewalk width		5 ft
	Sidewalk on <input checked="" type="checkbox"/> Both sides of street <input type="checkbox"/> Pole side <input type="checkbox"/> Other side		
LIGHT POLE DATA	Luminaire mounting height		26 ft
	Arm length (horizontal)		8 ft
	Luminaires per pole		1
	Pole set-back from curb		2 ft
	Pole spacing (one pole cycle, parallel to path of travel)		120 ft
	Pole layout <input checked="" type="checkbox"/> One side <input type="checkbox"/> Opposite <input type="checkbox"/> Staggered <input type="checkbox"/> Median		
PERFORMANCE CRITERIA			
MAINTAINED ROADWAY ILLUMINATION			
LUMINANCE	Average luminance at pavement		0.4 cd/m ²
	Avg:min uniformity ratio		4.0
	Max:min uniformity ratio		8.0
DISABILITY GLARE	Max. veiling luminance ratio		0.4
MAINTAINED SIDEWALK ILLUMINATION			
PHOTOPIC ILLUMINANCE	Average horizontal at pavement		4.0 lux (0.4 fc)
	Avg:min uniformity ratio (horizontal)		4.0
	Min. vertical illum. at 4.9 ft, in directions of travel		1.0 lux (0.1 fc)
LED LUMINAIRE			
INPUT POWER	Max. nominal luminaire input power		NA
VOLTAGE	Nominal luminaire input voltage (or range as applicable)		120-277
LUMEN MAINT.	Min. % of initial output at 36,000 hours operation		90%
WARRANTY	Min. luminaire warranty		10 years
NOMINAL CCT	Rated correlated color temperature		3000&4000 ± 200K
BUG RATINGS	Max. nominal backlight-uplight-glare ratings		B2-U0-G2
FINISH	Luminaire housing finish color		Gray
MOUNTING	Method <input type="checkbox"/> Post-top <input checked="" type="checkbox"/> Side-arm <input type="checkbox"/> Trun./yoke <input type="checkbox"/> Swivel-tenon		
	Tenon nominal pipe size (NPS)		2"-3/8 - 3"
VIBRATION	ANSI C136.31 <input type="checkbox"/> Level 1 (normal) <input checked="" type="checkbox"/> Level 2 (bridge/overpass)		
THERMAL ENVIRONMENT	Typical min. ambient temperature during operation		-40 °C (-40°F)
	Typical max. ambient temperature during operation		40 °C (104°F)
ELECTRICAL IMMUNITY	ANSI C136.2 Comb. Wave Test Level	<input type="checkbox"/> Basic (6kV / 3kA) <input checked="" type="checkbox"/> Enhanced (10kV / 5kA)	<input type="checkbox"/> Elevated (20kV / 10kA)
CONTROL INTERFACE	<input type="checkbox"/> None <input type="checkbox"/> ANSI C136.10 (3-pin)	<input type="checkbox"/> ANSI C136.41, 5-pin	<input checked="" type="checkbox"/> ANSI C136.41, 7-pin
LED DRIVER	<input type="checkbox"/> Not dimmable <input checked="" type="checkbox"/> Dimmable, 0-10V (IEC 60929)		<input type="checkbox"/> Dimmable, DALI (IEC 62386)

9.2.1.3 Luminaire Designation: "150W HPS Cobrahead - Layout 03 - Collector Medium"

SITE PARAMETERS			
ROADWAY DATA	Median width (including curbs, gutters, and shoulders)		0 ft
	Number of vehicular lanes (total on both sides of median)		2
	Width of one vehicular lane		13 ft
	IES pavement class. <input type="checkbox"/> R1 <input type="checkbox"/> R2 <input checked="" type="checkbox"/> R3 <input type="checkbox"/> R4		
SIDEWALK DATA	Berm width (from curb to sidewalk)		2 ft
	Sidewalk width		5 ft
	Sidewalk on <input checked="" type="checkbox"/> Both sides of street <input type="checkbox"/> Pole side <input type="checkbox"/> Other side		
LIGHT POLE DATA	Luminaire mounting height		28 ft
	Arm length (horizontal)		6 ft
	Luminaires per pole		1
	Pole set-back from curb		2 ft
	Pole spacing (one pole cycle, parallel to path of travel)		130 ft
	Pole layout <input checked="" type="checkbox"/> One side <input type="checkbox"/> Opposite <input type="checkbox"/> Staggered <input type="checkbox"/> Median		
PERFORMANCE CRITERIA			
MAINTAINED ROADWAY ILLUMINATION			
LUMINANCE	Average luminance at pavement		0.6 cd/m ²
	Avg:min uniformity ratio		3.5
	Max:min uniformity ratio		6.0
DISABILITY GLARE	Max. veiling luminance ratio		0.4
MAINTAINED SIDEWALK ILLUMINATION			
PHOTOPIC ILLUMINANCE	Average horizontal at pavement		5.0 lux (0.5 fc)
	Avg:min uniformity ratio (horizontal)		4.0
	Min. vertical illum. at 4.9 ft, in directions of travel		2.0 lux (0.2 fc)
LED LUMINAIRE			
INPUT POWER	Max. nominal luminaire input power		NA
VOLTAGE	Nominal luminaire input voltage (or range as applicable)		120-277
LUMEN MAINT.	Min. % of initial output at 36,000 hours operation		90%
WARRANTY	Min. luminaire warranty		10 years
NOMINAL CCT	Rated correlated color temperature		3000&4000 ± 200K
BUG RATINGS	Max. nominal backlight-uplight-glare ratings		B2-U0-G2
FINISH	Luminaire housing finish color		Gray
MOUNTING	Method <input type="checkbox"/> Post-top <input checked="" type="checkbox"/> Side-arm <input type="checkbox"/> Trun./yoke <input type="checkbox"/> Swivel-tenon		
	Tenon nominal pipe size (NPS)		2"-3/8 - 3"
VIBRATION	ANSI C136.31 <input type="checkbox"/> Level 1 (normal) <input checked="" type="checkbox"/> Level 2 (bridge/overpass)		
THERMAL ENVIRONMENT	Typical min. ambient temperature during operation		-40 °C (-40°F)
	Typical max. ambient temperature during operation		40 °C (104°F)
ELECTRICAL IMMUNITY	ANSI C136.2 Comb. Wave Test Level	<input type="checkbox"/> Basic (6kV / 3kA) <input checked="" type="checkbox"/> Enhanced (10kV / 5kA) <input type="checkbox"/> Elevated (20kV / 10kA)	
CONTROL INTERFACE	<input type="checkbox"/> None <input type="checkbox"/> ANSI C136.10 (3-pin) <input type="checkbox"/> ANSI C136.41, 5-pin <input checked="" type="checkbox"/> ANSI C136.41, 7-pin		
LED DRIVER	<input type="checkbox"/> Not dimmable <input checked="" type="checkbox"/> Dimmable, 0-10V (IEC 60929) <input type="checkbox"/> Dimmable, DALI (IEC 62386)		

9.2.1.4 Luminaire Designation: "250W HPS Cobrahead - Layout 04 - Major Medium"

SITE PARAMETERS			
ROADWAY DATA	Median width (including curbs, gutters, and shoulders)		0 ft
	Number of vehicular lanes (total on both sides of median)		2
	Width of one vehicular lane		16 ft
	IES pavement class. <input type="checkbox"/> R1 <input type="checkbox"/> R2 <input checked="" type="checkbox"/> R3 <input type="checkbox"/> R4		
SIDEWALK DATA	Berm width (from curb to sidewalk)		2 ft
	Sidewalk width		5 ft
	Sidewalk on <input checked="" type="checkbox"/> Both sides of street <input type="checkbox"/> Pole side <input type="checkbox"/> Other side		
LIGHT POLE DATA	Luminaire mounting height		28 ft
	Arm length (horizontal)		8 ft
	Luminaires per pole		1
	Pole set-back from curb		2 ft
	Pole spacing (one pole cycle, parallel to path of travel)		110 ft
	Pole layout <input checked="" type="checkbox"/> One side <input type="checkbox"/> Opposite <input type="checkbox"/> Staggered <input type="checkbox"/> Median		
PERFORMANCE CRITERIA			
MAINTAINED ROADWAY ILLUMINATION			
LUMINANCE	Average luminance at pavement		0.9 cd/m ²
	Avg:min uniformity ratio		3.0
	Max:min uniformity ratio		5.0
DISABILITY GLARE	Max. veiling luminance ratio		0.3
MAINTAINED SIDEWALK ILLUMINATION			
PHOTOPIC ILLUMINANCE	Average horizontal at pavement		5.0 lux (0.5 fc)
	Avg:min uniformity ratio (horizontal)		4.0
	Min. vertical illum. at 4.9 ft, in directions of travel		2.0 lux (0.2 fc)
LED LUMINAIRE			
INPUT POWER	Max. nominal luminaire input power		NA
VOLTAGE	Nominal luminaire input voltage (or range as applicable)		120-277
LUMEN MAINT.	Min. % of initial output at 36,000 hours operation		90%
WARRANTY	Min. luminaire warranty		10 years
NOMINAL CCT	Rated correlated color temperature		3000&4000 ± 200K
BUG RATINGS	Max. nominal backlight-uplight-glare ratings		B2-U0-G2
FINISH	Luminaire housing finish color		Gray
MOUNTING	Method <input type="checkbox"/> Post-top <input checked="" type="checkbox"/> Side-arm <input type="checkbox"/> Trun./yoke <input type="checkbox"/> Swivel-tenon		
	Tenon nominal pipe size (NPS)		2"-3/8 - 3"
VIBRATION	ANSI C136.31 <input type="checkbox"/> Level 1 (normal) <input checked="" type="checkbox"/> Level 2 (bridge/overpass)		
THERMAL ENVIRONMENT	Typical min. ambient temperature during operation		-40 °C (-40°F)
	Typical max. ambient temperature during operation		40 °C (104°F)
ELECTRICAL IMMUNITY	ANSI C136.2 Comb. Wave Test Level	<input type="checkbox"/> Basic (6kV / 3kA) <input checked="" type="checkbox"/> Enhanced (10kV / 5kA)	<input type="checkbox"/> Elevated (20kV / 10kA)
CONTROL INTERFACE	<input type="checkbox"/> None <input type="checkbox"/> ANSI C136.10 (3-pin)	<input type="checkbox"/> ANSI C136.41, 5-pin	<input checked="" type="checkbox"/> ANSI C136.41, 7-pin
LED DRIVER	<input type="checkbox"/> Not dimmable <input checked="" type="checkbox"/> Dimmable, 0-10V (IEC 60929)		<input type="checkbox"/> Dimmable, DALI (IEC 62386)

9.2.1.5 Luminaire Designation: "250W HPS Cobrahead - Layout 05 - Major Medium"

SITE PARAMETERS			
ROADWAY DATA	Median width (including curbs, gutters, and shoulders)		0 ft
	Number of vehicular lanes (total on both sides of median)		4
	Width of one vehicular lane		12 ft
	IES pavement class. <input type="checkbox"/> R1 <input type="checkbox"/> R2 <input checked="" type="checkbox"/> R3 <input type="checkbox"/> R4		
SIDEWALK DATA	Berm width (from curb to sidewalk)		2 ft
	Sidewalk width		5 ft
	Sidewalk on <input checked="" type="checkbox"/> Both sides of street <input type="checkbox"/> Pole side <input type="checkbox"/> Other side		
LIGHT POLE DATA	Luminaire mounting height		26 ft
	Arm length (horizontal)		8 ft
	Luminaires per pole		1
	Pole set-back from curb		2 ft
	Pole spacing (one pole cycle, parallel to path of travel)		150 ft
	Pole layout <input checked="" type="checkbox"/> One side <input type="checkbox"/> Opposite <input type="checkbox"/> Staggered <input type="checkbox"/> Median		
PERFORMANCE CRITERIA			
MAINTAINED ROADWAY ILLUMINATION			
LUMINANCE	Average luminance at pavement		0.9 cd/m ²
	Avg:min uniformity ratio		3.0
	Max:min uniformity ratio		5.0
DISABILITY GLARE	Max. veiling luminance ratio		0.3
MAINTAINED SIDEWALK ILLUMINATION			
PHOTOPIC ILLUMINANCE	Average horizontal at pavement		5.0 lux (0.5 fc)
	Avg:min uniformity ratio (horizontal)		4.0
	Min. vertical illum. at 4.9 ft, in directions of travel		2.0 lux (0.2 fc)
LED LUMINAIRE			
INPUT POWER	Max. nominal luminaire input power		NA
VOLTAGE	Nominal luminaire input voltage (or range as applicable)		120-277
LUMEN MAINT.	Min. % of initial output at 36,000 hours operation		90%
WARRANTY	Min. luminaire warranty		10 years
NOMINAL CCT	Rated correlated color temperature		3000&4000 ± 200K
BUG RATINGS	Max. nominal backlight-uplight-glare ratings		B2-U0-G2
FINISH	Luminaire housing finish color		Gray
MOUNTING	Method <input type="checkbox"/> Post-top <input checked="" type="checkbox"/> Side-arm <input type="checkbox"/> Trun./yoke <input type="checkbox"/> Swivel-tenon		
	Tenon nominal pipe size (NPS)		2"-3/8 - 3"
VIBRATION	ANSI C136.31 <input type="checkbox"/> Level 1 (normal) <input checked="" type="checkbox"/> Level 2 (bridge/overpass)		
THERMAL ENVIRONMENT	Typical min. ambient temperature during operation		-40 °C (-40°F)
	Typical max. ambient temperature during operation		40 °C (104°F)
ELECTRICAL IMMUNITY	ANSI C136.2 Comb. Wave Test Level	<input type="checkbox"/> Basic (6kV / 3kA) <input checked="" type="checkbox"/> Enhanced (10kV / 5kA) <input type="checkbox"/> Elevated (20kV / 10kA)	
CONTROL INTERFACE	<input type="checkbox"/> None <input type="checkbox"/> ANSI C136.10 (3-pin) <input type="checkbox"/> ANSI C136.41, 5-pin <input checked="" type="checkbox"/> ANSI C136.41, 7-pin		
LED DRIVER	<input type="checkbox"/> Not dimmable <input checked="" type="checkbox"/> Dimmable, 0-10V (IEC 60929) <input type="checkbox"/> Dimmable, DALI (IEC 62386)		

9.2.1.6 Luminaire Designation: "250W HPS Cobrahead - Layout 06 - Major Medium"

SITE PARAMETERS			
ROADWAY DATA	Median width (including curbs, gutters, and shoulders)		0 ft
	Number of vehicular lanes (total on both sides of median)		4
	Width of one vehicular lane		13 ft
	IES pavement class. <input type="checkbox"/> R1 <input type="checkbox"/> R2 <input checked="" type="checkbox"/> R3 <input type="checkbox"/> R4		
SIDEWALK DATA	Berm width (from curb to sidewalk)		2 ft
	Sidewalk width		5 ft
	Sidewalk on <input checked="" type="checkbox"/> Both sides of street <input type="checkbox"/> Pole side <input type="checkbox"/> Other side		
LIGHT POLE DATA	Luminaire mounting height		34 ft
	Arm length (horizontal)		8 ft
	Luminaires per pole		1
	Pole set-back from curb		2 ft
	Pole spacing (one pole cycle, parallel to path of travel)		110 ft
	Pole layout <input type="checkbox"/> One side <input type="checkbox"/> Opposite <input checked="" type="checkbox"/> Staggered <input type="checkbox"/> Median		
PERFORMANCE CRITERIA			
MAINTAINED ROADWAY ILLUMINATION			
LUMINANCE	Average luminance at pavement		0.9 cd/m ²
	Avg:min uniformity ratio		3.0
	Max:min uniformity ratio		5.0
DISABILITY GLARE	Max. veiling luminance ratio		0.3
MAINTAINED SIDEWALK ILLUMINATION			
PHOTOPIC ILLUMINANCE	Average horizontal at pavement		5.0 lux (0.5 fc)
	Avg:min uniformity ratio (horizontal)		4.0
	Min. vertical illum. at 4.9 ft, in directions of travel		2.0 lux (0.2 fc)
LED LUMINAIRE			
INPUT POWER	Max. nominal luminaire input power		NA
VOLTAGE	Nominal luminaire input voltage (or range as applicable)		120-277
LUMEN MAINT.	Min. % of initial output at 36,000 hours operation		90%
WARRANTY	Min. luminaire warranty		10 years
NOMINAL CCT	Rated correlated color temperature		3000&4000 ± 200K
BUG RATINGS	Max. nominal backlight-uplight-glare ratings		B2-U0-G2
FINISH	Luminaire housing finish color		Gray
MOUNTING	Method <input type="checkbox"/> Post-top <input checked="" type="checkbox"/> Side-arm <input type="checkbox"/> Trun./yoke <input type="checkbox"/> Swivel-tenon		
	Tenon nominal pipe size (NPS)		2"-3/8 - 3"
VIBRATION	ANSI C136.31 <input type="checkbox"/> Level 1 (normal) <input checked="" type="checkbox"/> Level 2 (bridge/overpass)		
THERMAL ENVIRONMENT	Typical min. ambient temperature during operation		-40 °C (-40°F)
	Typical max. ambient temperature during operation		40 °C (104°F)
ELECTRICAL IMMUNITY	ANSI C136.2 Comb. Wave Test Level	<input type="checkbox"/> Basic (6kV / 3kA) <input checked="" type="checkbox"/> Enhanced (10kV / 5kA)	<input type="checkbox"/> Elevated (20kV / 10kA)
CONTROL INTERFACE	<input type="checkbox"/> None <input type="checkbox"/> ANSI C136.10 (3-pin)	<input type="checkbox"/> ANSI C136.41, 5-pin	<input checked="" type="checkbox"/> ANSI C136.41, 7-pin
LED DRIVER	<input type="checkbox"/> Not dimmable <input checked="" type="checkbox"/> Dimmable, 0-10V (IEC 60929)		<input type="checkbox"/> Dimmable, DALI (IEC 62386)

9.2.1.7 Luminaire Designation: "400W HPS Cobrahead - Layout 07 - Major High"

SITE PARAMETERS			
ROADWAY DATA	Median width (including curbs, gutters, and shoulders)		0 ft
	Number of vehicular lanes (total on both sides of median)		2
	Width of one vehicular lane		13 ft
	IES pavement class. <input type="checkbox"/> R1 <input type="checkbox"/> R2 <input checked="" type="checkbox"/> R3 <input type="checkbox"/> R4		
SIDEWALK DATA	Berm width (from curb to sidewalk)		2 ft
	Sidewalk width		5 ft
	Sidewalk on <input checked="" type="checkbox"/> Both sides of street <input type="checkbox"/> Pole side <input type="checkbox"/> Other side		
LIGHT POLE DATA	Luminaire mounting height		26 ft
	Arm length (horizontal)		8 ft
	Luminaires per pole		1
	Pole set-back from curb		2 ft
	Pole spacing (one pole cycle, parallel to path of travel)		100 ft
	Pole layout <input type="checkbox"/> One side <input type="checkbox"/> Opposite <input checked="" type="checkbox"/> Staggered <input type="checkbox"/> Median		
PERFORMANCE CRITERIA			
MAINTAINED ROADWAY ILLUMINATION			
LUMINANCE	Average luminance at pavement		1.2 cd/m ²
	Avg:min uniformity ratio		3.0
	Max:min uniformity ratio		5.0
DISABILITY GLARE	Max. veiling luminance ratio		0.3
MAINTAINED SIDEWALK ILLUMINATION			
PHOTOPIC ILLUMINANCE	Average horizontal at pavement		10.0 lux (1 fc)
	Avg:min uniformity ratio (horizontal)		4.0
	Min. vertical illum. at 4.9 ft, in directions of travel		5.0 lux (0.5 fc)
LED LUMINAIRE			
INPUT POWER	Max. nominal luminaire input power		NA
VOLTAGE	Nominal luminaire input voltage (or range as applicable)		120-277
LUMEN MAINT.	Min. % of initial output at 36,000 hours operation		90%
WARRANTY	Min. luminaire warranty		10 years
NOMINAL CCT	Rated correlated color temperature		3000&4000 ± 200K
BUG RATINGS	Max. nominal backlight-uplight-glare ratings		B2-U0-G2
FINISH	Luminaire housing finish color		Gray
MOUNTING	Method <input type="checkbox"/> Post-top <input checked="" type="checkbox"/> Side-arm <input type="checkbox"/> Trun./yoke <input type="checkbox"/> Swivel-tenon		
	Tenon nominal pipe size (NPS)		2"-3/8 - 3"
VIBRATION	ANSI C136.31 <input type="checkbox"/> Level 1 (normal) <input checked="" type="checkbox"/> Level 2 (bridge/overpass)		
THERMAL ENVIRONMENT	Typical min. ambient temperature during operation		-40 °C (-40°F)
	Typical max. ambient temperature during operation		40 °C (104°F)
ELECTRICAL IMMUNITY	ANSI C136.2 Comb. Wave Test Level	<input type="checkbox"/> Basic (6kV / 3kA) <input checked="" type="checkbox"/> Enhanced (10kV / 5kA)	<input type="checkbox"/> Elevated (20kV / 10kA)
CONTROL INTERFACE	<input type="checkbox"/> None <input type="checkbox"/> ANSI C136.10 (3-pin)	<input type="checkbox"/> ANSI C136.41, 5-pin	<input checked="" type="checkbox"/> ANSI C136.41, 7-pin
LED DRIVER	<input type="checkbox"/> Not dimmable <input checked="" type="checkbox"/> Dimmable, 0-10V (IEC 60929)		<input type="checkbox"/> Dimmable, DALI (IEC 62386)

9.2.1.8 Luminaire Designation: "150W HPS - Decorative Type A"


Photometric Calculations referenced in Required Submittals, #7 are not required for this Luminaire Type.



Recommendations	
Classification	Area Lighting
Pedestrian Activity	High
Luminaire Model and Part Number	Decorative Circular Down Light
Minimal Initial Lumens	5100
Luminance (cd/m2)	n/a
Lavg/min	n/a
Lmax/min	n/a
Veiling	n/a
Wattage	HPS 150W
Pole Configuration	n/a
Road Width	n/a
Pole spacing	n/a
Mounting Height	16ft
Arm Length	2ft
Quantity	6


9.2.1.9 Luminaire Designation: "250W HPS - Decorative Type B"

Photometric Calculations listed in Required Submittals #7 are required for this Luminaire Type. Use the information provided below to do so.

Type B	
Location: Commercial St & Wastegate Dr (Plaza Entrance)	
	
Recommendations	
Classification	Major
Pedestrian Activity	High
Luminaire Model and Part Number	Shoe Box
Minimal Initial Lumens	n/a
Luminance (cd/m2)	1.2
Lavg/min	3
Lmax/min	5
Veiling	0.3
Wattage	HPS 250W
Pole Configuration	Staggered
Road Width	74ft
Pole spacing	49ft of each side
Mounting Height	34ft
Arm Length	1
Quantity	20
Number of Lanes	4
Setback	8ft


9.2.1.10 Luminaire Designation: "150W HPS - Decorative Type C"

Photometric Calculations listed in Required Submittals #7 are required for this Luminaire Type. Use the information provided below to do so.

Type C	
Location: Snow Ave (with N Main St & Division St)	
	
Recommendations	
Classification	Local
Pedestrian Activity	Medium
Luminaire Model and Part Number	Shoe Box
Minimal Initial Lumens	n/a
Luminance	0.5
Lavg/min	6
Lmax/min	10
Veiling	0.4
Wattage	HPS 150W
Pole Configuration	One Side
Road Width	15ft
Pole spacing	112ft
Mounting Height	20ft
Arm Length	1
Quantity	5
Number of Lanes	2
Setback	5ft


9.2.1.11 Luminaire Designation: "400W HPS - Decorative Type D"

Photometric Calculations referenced in Required Submittals, #7 are not required for this Luminaire Type.

Type D	
Locations: Oakdale St (Beside School) Coe Rd (School Parking Lot) Kingman St (Brockton Public Library)	
	
Recommendations	
Classification	Parking Lot
Pedestrian Activity	Low
Luminaire Model and Part Number	Flood Light
Minimal Initial Lumens	16100
Luminance (cd/m2)	n/a
Lavg/min	n/a
Lmax/min	n/a
Veiling	n/a
Wattage	HPS 400W
Pole Configuration	n/a
Road Width	n/a
Pole spacing	n/a
Mounting Height	n/a
Arm Length	n/a
Quantity	8
Number of Lanes	n/a
Setback	n/a


9.2.1.12 Luminaire Designation: "400W HPS - Decorative Type E"

Photometric Calculations referenced in Required Submittals, #7 are not required for this Luminaire Type.

Type E	
Locations: Brockton Fire Museum Electric Ave (Beside School Parking Lot) Newbury St (Beside Ithaca-Lincoln High School) Abbott Pl (Behind School) Raon CT (Soccer Field) Oakland (Soccer Field) W Elm St (Brockton War Memorial Building and Parking Lot)	
	
Recommendations	
Classification	Area Lighting
Pedestrian Activity	Low
Luminaire Model and Part Number	Flood Light
Minimal Initial Lumens	16100
Luminance (cd/m2)	n/a
Lavg/min	n/a
Lmax/min	n/a
Veiling	n/a
Wattage	HPS 400W
Pole Configuration	n/a
Road Width	n/a
Pole spacing	n/a
Mounting Height	n/a
Arm Length	n/a
Quantity	10


9.2.1.13 Luminaire Designation: "150W HPS - Decorative Type F"

Photometric Calculations referenced in Required Submittals, #7 are not required for this Luminaire Type.

Type F	
Location: E Elm St	
	
Recommendations	
Classification	Area Lighting
Pedestrian Activity	Medium
Luminaire Model and Part Number	Top Hat
Minimal Initial Lumens	6900
Luminance (cd/m2)	n/a
Lavg/min	n/a
Lmax/min	n/a
Veiling	n/a
Wattage	HPS 150W
Pole Configuration	n/a
Road Width	n/a
Pole spacing	n/a
Mounting Height	20
Arm Length	0
Quantity	1
Number of Lanes	n/a
Setback	n/a


9.2.1.14 Luminaire Designation: "150W HPS - Decorative Type G"

Photometric Calculations listed in Required Submittals #7 are required for this Luminaire Type. Use the information provided below to do so.

Type G	
Locations: Legion Pkwy Vfm Pkwy E Elm St Winthrop Square Clock Park	
	
Recommendations	
Classification	Major
Pedestrian Activity	Medium
Luminaire Model and Part Number	Acorn Post Top
Minimal Initial Lumens	n/a
Luminance	0.9
Lavg/min	3
Lmax/min	5
Veiling	0.3
Wattage	HPS 150W
Pole Configuration	Middle 4ft width
Road Width	32ft each side
Pole spacing	40ft
Mounting Height	20ft
Arm Length	0
Quantity	27
Number of Lanes	2


9.2.1.15 Luminaire Designation: "150W HPS - Decorative Type H"

Photometric Calculations listed in Required Submittals #7 are required for this Luminaire Type. Use the information provided below to do so.

Type H	
Locations: Main St School St Lincoln St Massachusetts St	
	
Recommendations	
Classification	Major
Pedestrian Activity	Medium
Luminaire Model and Part Number	Acorn Post Top
Minimal Initial Lumens	n/a
Luminance	0.9
Lavg/min	3
Lmax/min	5
Veiling	0.3
Wattage	HPS 150W
Pole Configuration	Staggered
Road Width	48ft
Pole spacing	78ft of each side
Mounting Height	15ft
Arm Length	0
Quantity	60
Number of Lanes	2
Setback	2


9.2.1.16 Luminaire Designation: "150W HPS - Decorative Type I"

Photometric Calculations referenced in Required Submittals, #7 are not required for this Luminaire Type.

Type I	
Locations: Pearl Way Marshalls Corner Rd Michelle Ln	
	
Recommendations	
Classification	Local
Pedestrian Activity	Low
Luminaire Model and Part Number	Victorian Lantern
Minimal Initial Lumens	4781
Luminance (cd/m2)	n/a
Lavg/min	n/a
Lmax/min	n/a
Veiling	n/a
Wattage	HPS 150W
Pole Configuration	n/a
Road Width	n/a
Pole spacing	n/a
Mounting Height	15ft
Arm Length	n/a
Quantity	8
Number of Lanes	n/a
Setback	n/a


9.2.1.17 Luminaire Designation: "150W HPS - Decorative Type J"

Photometric Calculations referenced in Required Submittals, #7 are not required for this Luminaire Type.

Type J	
Location: Quincy St Lot	
	
Recommendations	
Classification	Parking Lot
Pedestrian Activity	Low
Luminaire Model and Part Number	Shoe Box
Minimal Initial Lumens	n/a
Illuminance Minimal	5 lux
Lavg/min	n/a
Lmax/min	n/a
Veiling	n/a
Wattage	HPS 150W
Pole Configuration	n/a
Road Width	n/a
Pole spacing	n/a
Mounting Height	28ft
Arm Length	1
Quantity	45
Number of Lanes	n/a
Setback	n/a


9.2.1.18 Luminaire Designation: "250W HPS - Decorative Type K"

Photometric Calculations referenced in Required Submittals, #7 are not required for this Luminaire Type.

Type K	
Location: Electric Ave and Parking Lot	
	
Recommendations	
Classification	Parking Lot
Pedestrian Activity	Low
Luminaire Model and Part Number	Shoe Box Post Top
Minimal Initial Lumens	6000
Illuminance Minimal	5 lux
Lavg/min	n/a
Lmax/min	n/a
Veiling	n/a
Wattage	HPS 250W
Pole Configuration	n/a
Road Width	n/a
Pole spacing	n/a
Mounting Height	17ft
Arm Length	n/a
Quantity	5
Number of Lanes	n/a
Setback	n/a

9.2.1.19 Luminaire Designation: "150W HPS - Decorative Type L"

Photometric Calculations referenced in Required Submittals, #7 are not required for this Luminaire Type.

Type L	
Locations: Maple Ave Parking Lot Hill St	
	
Recommendations	
Classification	Parking Lot
Pedestrian Activity	Low
Luminaire Model and Part Number	Shoe Box
Minimal Initial Lumens	2800
Illuminance Minimal	5 lux
Lavg/min	n/a
Lmax/min	n/a
Veiling	n/a
Wattage	HPS 150W
Pole Configuration	n/a
Road Width	n/a
Pole spacing	n/a
Mounting Height	20ft
Arm Length	n/a
Quantity	40
Number of Lanes	n/a
Setback	n/a

9.2.2 Brockton Schools Outdoor Lighting

9.2.2.1 Minimum Initial Lumens

Brockton Schools Outdoor LED products must meet or exceed the minimum Initial Lumens listed in the table below.

Luminaire Type	Existing Wattage	Minimal Initial Lumens
A1 - Emergency Light (1 Bulb)	9W	n/a
B1 - Emergency Light (2 Bulb)	18W	n/a
C1 - Decorative Bell Downlight	150W	5100
D1 - Decorative Circle Style	150W	7500
E1 - Decorative Post Top Round Style	150W	6900
F1 - Decorative Wall Mount Incandescent	150W	1500
G1 - Wall Mount Tubular Downlight	150W	1500
H1 - Shoe Box	150W	7500
I1 - Shoe Box	250W	9100
J1 - Bollard Luminaire	150W	1100
K1 - Wallpack	150W	3800
L1 - Canopy Light	50W	4200
M1 - Floodlight	1000W	21000
N1 - Wallpack	400W	8300
O1 - Floodlight (Wall Mounted)	400W	16100
P1 - Floodlight (Wall Mounted)	1000W	21000
Q1 - Canopy Light	70W	4200
R1 - Wallpack	250W	8200
S1 - Floodlight (Wall Mounted)	250W	10100
T1 - Floodlight	400W	16100
U1 - Canopy Light	400W	16300
V1 - Pendant (Incandescent)	250W	1000
W1 - Floodlight	250W	10500
X1 - Wallpack (small)	70W	2100
Y1 - Pendant Medium Bay (Outdoor)	100W	400
Z1 - Downlight Recessed	100W	4200

9.2.2.2 Inventory of Luminaire Types and Quantity by School

Nb r	School Name	Before Type	Image	Qty
1	1. South Middle School	K - Wallpack 150W	K1	5
2	1. South Middle School	B - Emergency Light (2 Bulb) 18W	B1	21
3	1. South Middle School	A - Emergency Light (1 Bulb) 9W	A1	5
4	1. South Middle School	L - Canopy Light 50W	L1	2
5	1. South Middle School	M - Floodlight 1000W	M1	3
6	2. Davis Elementary School	N - Wallpack 400W	N1	23
7	2. Davis Elementary School	O - Floodlight (Wall Mounted) 400W	O1	2
8	2. Davis Elementary School	P - Floodlight (Wall Mounted) 1000W	P1	2
9	2. Davis Elementary School	Q - Canopy Light 70W	Q1	43
10	3. Gilmore Early Childhood Center	R - Wallpack 250W	R1	8
11	3. Gilmore Early Childhood Center	S - Floodlight (Wall Mounted) 250W	S1	2
12	3. Gilmore Early Childhood Center	T - Floodlight 400W	T1	5
13	4. Huntington Elementary School	N - Wallpack 400W	N1	20
14	4. Huntington Elementary School	Q - Canopy Light 70W	Q1	4
15	4. Huntington Elementary School	T - Floodlight 400W	T1	3
16	5. Goddard Alternative School	R - Wallpack 250W	R1	2
17	5. Goddard Alternative School	A - Emergency Light (1 Bulb) 9W	A1	2
18	5. Goddard Alternative School	T - Floodlight 400W	T1	2
19	6. Arnone Elementary School	R - Wallpack 250W	R1	29
20	6. Arnone Elementary School	Q - Canopy Light 70W	Q1	5
21	6. Arnone Elementary School	M - Floodlight 1000W	M1	6
22	6. Arnone Elementary School	E - Decorative Post Top Round Style 150W	E1	10
23	6. Arnone Elementary School	D - Decorative Circle Style 150W	D1	4
24	6. Arnone Elementary School	C - Decorative Bell Downlight 150W	C1	13
25	7. Crosby Administration Building	R - Wallpack 250W	R1	5
26	7. Crosby Administration Building	P - Floodlight (Wall Mounted) 1000W	P1	1
27	7. Crosby Administration Building	F - Decorative Wall Mount Incandescent 150W	F1	2
28	7. Crosby Administration Building	U - Canopy Light 150W	U1	9
29	7. Crosby Administration Building	V - Pendant (Incandescent) 250W	V1	1
30	8. Adult Learning Center (Paine School)	R - Wallpack 250W	R1	2
31	8. Adult Learning Center (Paine School)	O - Floodlight (Wall Mounted) 400W	O1	2
32	8. Adult Learning Center (Paine School)	T - Floodlight 400W	T1	4

33	9. Plouffe Academy	N - Wallpack 400W	N1	20
34	9. Plouffe Academy	O - Floodlight (Wall Mounted) 400W	O1	1
35	9. Plouffe Academy	U - Canopy Light 150W	U1	3
36	9. Plouffe Academy	H - Shoe Box 150W	H1	11
37	10. East Middle School	R - Wallpack 250W	R1	5
38	10. East Middle School	O - Floodlight (Wall Mounted) 400W	O1	11
39	10. East Middle School	U - Canopy Light 150W	U1	16
40	10. East Middle School	T - Floodlight 400W	T1	14
41	10. East Middle School	Cobrahead 100W	NA1	1
42	11. Shaw School	A - Emergency Light (1 Bulb) 9W	A1	2
43	11. Shaw School	W - Floodlight 250W	W1	2
44	12. Mary E. Baker School	G - Wall Mount Tubular Downlight 150W	G1	24
45	12. Mary E. Baker School	Q - Canopy Light 70W	Q1	9
46	12. Mary E. Baker School	C - Decorative Bell Downlight 150W	C1	44
47	12. Mary E. Baker School	J - Bollard Luminaire 150W	J1	11
48	13. Ashfield Middle School	R - Wallpack 250W	R1	15
49	13. Ashfield Middle School	Q - Canopy Light 70W	Q1	5
50	13. Ashfield Middle School	T - Floodlight 400W	T1	7
51	14. Brookfield Elementary School	N - Wallpack 400W	N1	20
52	14. Brookfield Elementary School	P - Floodlight (Wall Mounted) 1000W	P1	4
53	14. Brookfield Elementary School	A - Emergency Light (1 Bulb) 9W	A1	7
54	14. Brookfield Elementary School	Q - Canopy Light 70W	Q1	7
55	14. Brookfield Elementary School	T - Floodlight 400W	T1	7
56	15. North Middle School	N - Wallpack 400W	N1	11
57	15. North Middle School	O - Floodlight (Wall Mounted) 400W	O1	14
58	15. North Middle School	B - Emergency Light (2 Bulb) 18W	B1	1
59	15. North Middle School	Q - Canopy Light 70W	Q1	7
60	15. North Middle School	T - Floodlight 400W	T1	2
61	15. North Middle School	Cobrahead 70W	NA1	2
62	16. Raymond Elementary School	N - Wallpack 400W	N1	23
63	16. Raymond Elementary School	O - Floodlight (Wall Mounted) 400W	O1	3
64	16. Raymond Elementary School	Q - Canopy Light 70W	Q1	42
65	16. Raymond Elementary School	H - Shoe Box 150W	H1	34
66	17. George Elementary School	G - Wall Mount Tubular Downlight 150W	G1	23
67	17. George Elementary School	Q - Canopy Light 70W	Q1	9
68	17. George Elementary School	C - Decorative Bell Downlight 150W	C1	40
69	17. George Elementary School	J - Bollard Luminaire 150W	J1	7
70	18. Angelo Elementary School	N - Wallpack 400W	N1	16
71	18. Angelo Elementary School	Q - Canopy Light 70W	Q1	4
72	18. Angelo Elementary School	T - Floodlight 400W	T1	1
73	18. Angelo Elementary School	H - Shoe Box 150W	H1	11

74	19. Barrett Russell School	O - Floodlight (Wall Mounted) 400W	O1	9
75	19. Barrett Russell School	Q - Canopy Light 70W	Q1	2
76	19. Barrett Russell School	T - Floodlight 400W	T1	5
77	19. Barrett Russell School	Cobrahead 50W	NA1	2
78	20. The Keith Center	N - Wallpack 400W	N1	2
79	20. The Keith Center	K - Wallpack 150W	K1	10
80	20. The Keith Center	X - Wallpack (small) 70W	X1	1
81	20. The Keith Center	T - Floodlight 400W	T1	5
82	21. West Middle School	N - Wallpack 400W	N1	4
83	21. West Middle School	X - Wallpack (small) 70W	X1	3
84	21. West Middle School	Q - Canopy Light 70W	Q1	8
85	21. West Middle School	T - Floodlight 400W	T1	4
86	21. West Middle School	Cobrahead 250W	NA1	2
87	22. Hancock Elementary School	N - Wallpack 400W	N1	13
88	22. Hancock Elementary School	O - Floodlight (Wall Mounted) 400W	O1	3
89	22. Hancock Elementary School	X - Wallpack (small) 70W	X1	3
90	22. Hancock Elementary School	Q - Canopy Light 70W	Q1	7
91	22. Hancock Elementary School	Y - Pendant Medium Bay (Outdoor) 100W	Y1	7
92	22. Hancock Elementary School	T - Floodlight 400W	T1	4
93	22. Hancock Elementary School	Cobrahead 100W	NA1	4
94	23. Brockton High School	N - Wallpack 400W	N1	20
95	23. Brockton High School	S - Floodlight (Wall Mounted) 250W	S1	43
96	23. Brockton High School	A - Emergency Light (1 Bulb) 9W	A1	7
97	23. Brockton High School	Z - Downlight Recessed 100W	Z1	88
98	23. Brockton High School	T - Floodlight 400W	T1	72
99	23. Brockton High School	I - Shoe Box 150W	I1	20

9.2.2.3 Images of School Lights

Luminaire Type	Image
A1 - Emergency Light (1 Bulb)	 A photograph of a single emergency light fixture mounted on a red brick wall. The fixture is a small, white, rectangular unit with a metal cage protecting the bulb.
B1 - Emergency Light (2 Bulb)	 A photograph of a double emergency light fixture mounted on a red brick wall. The fixture is a white, rectangular unit with two circular light lenses and a metal cage.
C1 - Decorative Bell Downlight	 A photograph of a decorative bell-shaped downlight fixture mounted on a black pole. The fixture is a black, bell-shaped unit with a glass lens. The background shows a grassy area and trees.
D1 - Decorative Circle Style	 A photograph of a decorative circle-style light fixture mounted on a pole. The fixture is a black, circular unit with a glass lens. The background shows a grassy area and trees.

E1 - Decorative Post Top Round Style



F1 - Decorative Wall Mount Incandescent



G1 - Wall Mount Tubular Downlight



H1 - Shoe Box



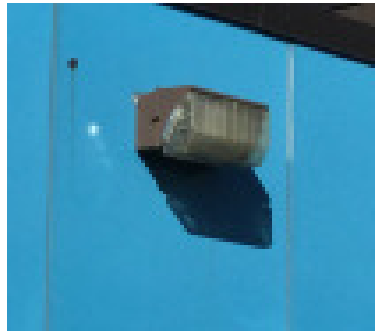
I1 - Shoe Box



J1 - Bollard Luminaire







K1 - Wallpack



L1 - Canopy Light



<p>M1 - Floodlight</p>	
<p>N1 - Wallpack</p>	
<p>O1 - Floodlight (Wall Mounted)</p>	
<p>P1 - Floodlight (Wall Mounted)</p>	

Q1 - Canopy Light



R1 - Wallpack



S1 - Floodlight (Wall Mounted)



T1 - Floodlight



U1 - Canopy Light



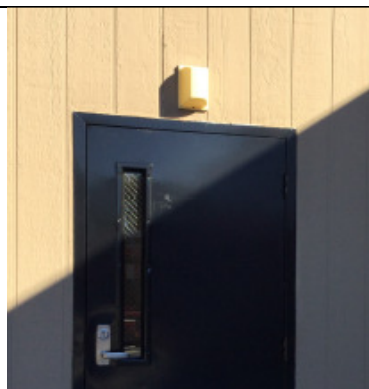
V1 - Pendant (Incandescent)



W1 - Floodlight



X1 - Wallpack (small)



Y1 - Pendant Medium Bay (Outdoor)



Z1 - Downlight Recessed



9.3 Luminaire General requirements

1. Luminaires shall satisfy the key criteria summarized in item 9.2. Products shall be selected in part on the basis of best value. Provide summary of luminaire attributes that significantly exceed the key criteria and/or detail items that do not satisfy criteria but could be determined to be acceptable.
2. Luminaries must be Design Light Consortium listed and must appear in the DLC Qualified Product list at the time of submission. Respondent must indicate whether LED products are DLC Standard or Premium.
3. Transmissive optical components shall be applied in accordance with OEM design guidelines to ensure suitability for the environment (e.g., electromagnetic, thermal, mechanical, chemical).
4. Luminaire shall be designed for ease of component replacement and end-of-life disassembly.
5. LED light source(s) and driver(s) shall be RoHS compliant.
6. Nominal luminaire input wattage shall account for nominal applied voltage and any reduction in driver efficiency due to sub-optimal driver loading.
7. Luminaire shall accept the voltage or voltage range specified at 50/60 Hz, and shall operate normally for input voltage fluctuations of plus or minus 10 percent.
8. All internal components shall be assembled and pre-wired using modular electrical connections.
9. The following shall be in accordance with corresponding sections of ANSI C136.37
 - 9.1. Wiring and grounding
 - 9.2. Terminal blocks for incoming AC lines (electrical mains wires)
 - 9.3. Photocontrol receptacle. An ANSI compliant, 7-wire (PRC7) photocontrol receptacle with the dimming connections shall be furnished.
 - 9.4. Latching and hinging
 - 9.5. Mounting provisions
 - 9.6. Ingress protection
10. The luminaire shall have the capability to install a light shield on the house side of the luminaire.

9.4 Painted or finished luminaire surfaces exposed to the environment

1. Shall exceed a rating of six per ASTM D1654 after 1000 hours of testing per ASTM B117.
2. The coating shall exhibit no greater than 30% reduction of gloss per ASTM D523, after 500 hours of QUV testing at ASTM G154 Cycle 6.

9.5 Thermal management

1. Luminaire shall start and operate in ambient temperature range specified.
2. Maximum rated case temperature of driver and other internal components shall not be exceeded when luminaire is operated in ambient temperature range specified.
3. Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation.
4. Liquids or other moving parts shall be clearly indicated in submittals, shall be consistent with product testing, and shall be subject to review by the City.

9.6 LED Driver, Photo-control Receptacle, and Control Interface

1. Luminaire designation(s) indicated "ANSI C136.41, 7-pin" in item 9.2 shall be fully prewired and shall incorporate an ANSI C136.41 compliant receptacles. If a dimmable LED driver is specified, its 0-10V control wires shall be connected to the receptacle pads as specified in ANSI C136.41; connection of the two remaining pads shall be by Supplier, as directed by the City.

9.7 Electrical safety testing

1. Luminaire shall be listed for wet locations by a U.S. Occupational Safety Health Administration (OSHA) Nationally Recognized Testing Laboratory (NRTL).
2. Luminaire shall have locality-appropriate governing mark and certification.
3. Luminaire shall meet the performance requirements specified in ANSI C136.2 for dielectric withstand, using the DC test level and configuration.

9.8 Electrical immunity

1. Luminaire shall meet the performance requirements specified in ANSI C136.2 for electrical immunity, using the combination wave test level indicated in item 9.2. If not specified in the tables, this must be Enhanced (10kV / 5kA).
2. Manufacturer shall indicate on submittal form whether failure of the electrical immunity system can possibly result in disconnect of power to luminaire.

9.9 Interference and power quality

1. Luminaire shall comply with FCC 47 CFR part 15 interference criteria for Class B digital devices.
2. Luminaire shall comply with ANSI C82.77 at full input power and across specified voltage range.

9.10 Color attributes

1. Color Rendering Index (CRI) shall be no less than 70.
2. Nominal Correlated Color Temperature (CCT) shall be as specified in item 9.2.
3. If submitted nominal CCT is listed in Table 9.10.1 below, measured CCT and Duv shall be as listed in Table 9.10.1.

Table 9.10.1 Allowable CCT and Duv

Manufacturer-Rated Nominal CCT (K)	Allowable IES LM-79 Chromaticity Values	
	Measured CCT (K)	Measured Duv
3000	2870 to 3220	-0.006 to 0.006
4000	3710 to 4260	-0.005 to 0.007

- 1.1.1 If submitted nominal CCT is not listed in Table 9.10.1, measured CCT and Duv shall be as per the criteria for Flexible CCT defined in ANSI C78.377.

9.11 Identification

1. Luminaire shall have an external label per ANSI C136.15.
2. Luminaire shall have an internal label per ANSI C136.22.
3. In addition, Luminaire shall be identified with a label to clearly define ownership and maintenance responsibilities. Please refer to "Appendix A - National Grid - Customer Owned Streetlight Equip Standards – Page 4" for more details about label size and characteristics.

9.12 Quality Assurance

1. Before approval and purchase, the City might request luminaire sample(s) identical to the product configuration(s) submitted. In addition, the City may request IES LM-79 and/or IES LM-50 testing of luminaire sample(s) to verify performance is within manufacturer-reported tolerances.
2. Electrically test fully assembled luminaires before shipment from factory.
3. After installation, the City may perform IES LM-79 and/or IES LM-50 field measurements to verify performance requirements, giving consideration to manufacturing tolerances and measurement uncertainties as outlined in IES LM- 61 and NEMA LSD 63.
4. All components must be constructed using new materials.
5. The facility/facilities that manufacture(s) the LED luminaires and associated components shall be ISO9001 certified or equivalent, indicating quality management systems.

9.13 Warranty

1. Warranty shall be of the minimum duration of ten (10) years, and shall cover maintained integrity and functionality of the following:
 - 1.1. Luminaire housing, wiring, and connections
 - 1.2. LED light source(s)
 - 1.3. Negligible light output from more than 10 percent of the LED packages constitutes luminaire failure.
 - 1.4. LED driver(s)
 - 1.5. Finish shall have a 10 year limited warranty against cracking, peeling, excessive fading and corrosion defects
2. Warranty period shall begin 90 days after date of invoice.
3. Any packaging, shipping and handling costs, to and from the manufacturer, on returned components or luminaires under the warranty shall be at the expense of the supplier for at least the first year.

9.14 Manufacturer Services

1. Manufacturer or local sales representative shall provide installation and troubleshooting support via telephone and/or email.

9.15 Eligible Manufacturers

1. Any manufacturer offering products that comply with the required product performance and operation criteria may be considered. Only products qualifying as "Manufactured in North America" will be considered.

9.16 Long Life Photo Controls Requirements

Minimum requirements

Electrical:

- a) Load Rating: 1,000W/1,800 VA
- b) 15 Amp relay tested to 15,000 operations at 1,000 watts.
- c) Operating Temperature -40°C to +70°C - (-40°F to +158°)
- d) Surge Protection: 40,000 Amps - 640 Joule
- e) Power Consumption: <0.5 Watts @ 120 V
- f) Rated 105- 305 VAC for 120, 208, 240 and 277 VAC systems
- g) Dielectric Strength: Between current carrying parts and metal surfaces
- h) Frequency: 50/60Hz

Mechanical:

- i) Photocell: Silicon light sensor
- j) Operating Light Levels: Turn-on: 1.5 FC, 1.5:1 Off/On Ratio and/or other options available.

Other:

- k) Must meet or exceed ANSI C136.10
- l) ROHS compliant
- m) UL listed to U.S.
- n) "Fail On" option must be available.

Warranty:

- o) 10 years or more.

10. Exhibit “B” – Product Submittal Form

Product Submittal form must be completed electronically on the provided Excel Spreadsheet. Spreadsheet is available online at www.brockton.ma.us . Go to the Information Tab, then to Procurement Postings. The spreadsheet is listed as one of the downloadable forms under Project #DPW-17LED

11. Appendices A to G

See attached Word document, labeled "City Appendices A to G".

12. Appendix H – National Grid - Customer Owned Streetlight Equip Standards

See attached PDF document, labeled "Appendix H-- NRID Customer Owned Streetlight Equip Standards".